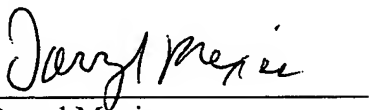
REMARKS

Entry and consideration of this Amendment are respectfully requested.

Respectfully submitted,



Darryl Mexic
Registration No. 23,063

SUGHRUE MION, PLLC
2100 Pennsylvania Avenue, N.W.
Washington, D.C. 20037-3213
Telephone: (202) 293-7060
Facsimile: (202) 293-7860
Date: April 4, 2002

APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification is changed as follows:

Page 5, second full paragraph:

(Twice Amended) In the second aspect, ~~the~~a hydration degree of the ink-repellent film can be restrained to be relatively low.

Page 5, eighth full paragraph:

(Twice Amended) A fifth aspect of the present invention according to any one of the first to ~~sixth~~fourth aspects is the head member characterized in that the hydration degree of the ink-repellent film is 0.2 or lower.

Page 24, first full paragraph:

(Twice Amended) In the ink-jet recording head 10 thus constituted, since the peizoelectric element 19 extends toward the nozzle plate 15 when a voltage is applied to the electrode forming materials 20 and ~~21~~22 of the piezoelectric element 19, the elastic plate 13 is displaced, and a volume of the pressure generating chamber 12 is compressed. Hence, for example, it is possible to remove a voltage in a state where a bias voltage of about 30V is applied in advance and to make the piezoelectric element 19 shrink, thus causing the ink to flow from the reservoir 17 through the ink supply port 16 into the pressure generating chamber 12. And thereafter, by applying a voltage, the piezoelectric element 19 is extended, the pressure generating chamber 12 is shrunk by the elastic plate 13, and ink droplets are ejected from the ejection port 14.

Page 36, first full paragraph:

(Twice Amended) As described above, ink-repellent films denoted by the codes ~~θ~~C to F, the hydration degree is restrained in a range of 0.2 or lower, and the relative polymerization degree is also restrained in a range of 0.2 or lower. It is understood that the ink repellency of the ink-repellent film can be improved by restraining the hydration degree and the relative polymerization degree of the ink-repellent film to be relatively low in such a manner.

Page 38, first full paragraph:

In the apparatus thus constituted, the ink-repellent films 25a made of the flourocarbon resin in the ejection ports 14 can be removed as below. Specifically, the process gas 68 is introduced between the high-frequency electrode 63 and the grounding electrode 66. As shown in Fig. ~~7~~6, the process gas 68 is converted into plasma by the generated gaseous discharges 67. In this embodiment, the process gas 68 is converted into plasma under the atmospheric pressure. Therefore, since an expensive vacuum apparatus is not required for converting the process gas 68 into plasma, the cost can be reduced to be inexpensive. Moreover, evacuation treatment for evacuating a region where the process gas 68 is converted into plasma is not required. Therefore, time required for removing the ink-repellent films 25a can be shortened.

Page 40, fourth paragraph:

Fig. 8 is an explanatory view showing an in-ejection-port ink-repellent film removing apparatus 80 of the embodiment 3. In this embodiment, the case is shown, where the flourocarbon resin ~~24a~~25a of the ejection ports 14 are removed by ultraviolet rays 81. As shown

in Fig. 8, in this embodiment, a chamber 82 disposing the nozzle plate 15 therein is provided. An ultraviolet radiation lamp 83 as ultraviolet radiating means is provided in an upper portion of the chamber 82, and the ultraviolet rays 81 can be radiated downward from the ultraviolet radiation lamp 83. As shown in Fig. 8, the nozzle plate 15 is disposed in a lower portion in the chamber 82. Moreover, in this embodiment, a vacuum pump 84 as pressure reducing means is connected to the chamber 82, and the inside of the chamber 82 is maintained at a pressure nearly vacuum by the vacuum pump 84. Thus, the ultraviolet rays 81 radiated downward from the ultraviolet radiation lamp 83 in the chamber 82 can irradiate the ink-repellent films 25a in the ejection ports 14 without great diffusion or scattering. Since the ink-repellent films 25a in the ejection ports 14 are decomposed by the ultraviolet rays 81, the ink-repellent films 25a can be removed from the ejection ports 14 by irradiating the ultraviolet rays 81. Moreover, the ultraviolet rays 81 have properties that they become attenuated immediately after being reflected. Therefore, the situation can be prevented, where the ultraviolet rays 81 incident onto the ink-repellent films 25a are reflected and incident onto the ink-repellent films 25 of the ejection surfaces 15a. Hence, the ink-repellent films 25a in the ejection ports 14 can be removed without affecting the ink-repellent films 25 on the peripheries of the ejection ports 14. As such ultraviolet rays, the one having a wavelength of 380 nm or shorter can be preferably used, and the one having a wavelength of 200 nm or shorter can be more preferably used. Moreover, in the case where the ink-repellent films 25a in the ejection ports 14 are removed by the ultraviolet rays 81 when the ink-repellent films 25, each having a film thickness of 0.2 μm, are formed, it takes about 10 to 30 minutes for that process.